DOCUMENT RESUME

ED 480 237 IR 022 428

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TITLE	Reflection as a Critical Component of the Technology Adoption Process. ERIC Digest.
INSTITUTION	ERIC Clearinghouse on Information and Technology, Syracuse, NY.
SPONS AGENCY	Institute of Education Sciences (ED), Washington, DC.
REPORT NO	EDO-IR-2003-04
PUB DATE	2003-04-00
NOTE	4p.
CONTRACT	ED-99-CO-0005
AVAILABLE FROM	ERIC Clearinghouse on Information & Technology, Syracuse University, 621 Skytop Rd., Suite 160, Syracuse, NY 13244-5290. Tel: 315-443-3640; Tel: 800-464-9107 (Toll Free); Fax: 315-443-5448; e-mail: eric@ericit.org; Web site: http://ericit.org/. For full text: http://ericit.syr.edu/ digests/EDO-IR-2003-04.pdf/.
PUB TYPE	ERIC Publications (071) -- ERIC Digests in Full Text (073)
EDRS PRICE	EDRS Price MF01/PC01 Plus Postage.
DESCRIPTORS	Computer Assisted Instruction; Educational Development; Educational Practices; Educational Research; Educational Resources; *Educational Technology; Instructional Development; Professional Development; Teaching Methods; *Technology Integration
IDENTIFIERS	*ERIC Digests; *Reflection Process; Self Reflection; Technology Implementation

ABSTRACT

This digest briefly reviews connections among the literature on the adoption of innovations, technology integration, and the value of reflection in encouraging educators to explore the integration of new educational technologies into their current teaching practices. An approach to prompting reflection is described, which uses structured guidance in the form of asking questions and providing guidelines. An example is presented of reflective practice during a technology integration professional development program. The reflection component is designed to help educators reflect on the possibilities and challenges of their surroundings, as they construct knowledge of how best to integrate educational technologies into teaching practices. (AEF)

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ERIC Digest

October 2003

ERIC Clearinghouse on Information & Technology at Syracuse University
621 Skytop Road, Suite 160
Syracuse, New York 13244
www.ericit.org
EDO-IR-2003-04

Reflection as a Critical Component of the Technology Adoption Process

By Tiffany A. Koszalka

Although upwards of 99% of public schools are wired for some type of technology access (NCES, 2003) less than 32% of educators reported regularly integrating such educational technologies into their classroom practices (NCES, 2000). How can this be? Ely (1999) suggested that there are several conditions required to facilitate implementation of educational technologies into sustained practice. Educators must be dissatisfied with status quo, possess technology knowledge and skills, have access to technology resources, be provided with time and rewards for achievement, be directly involved with decisions and committed to technology integration, and have supportive leadership to effectively implement educational technologies into their classrooms. Unfortunately, much of today's educational technology training tends to focus only on developing the skills and knowledge to operate new equipment (Ronnkvist, Dexter, & Anderson 2000). But, there is hope. Many researchers are reporting that adding reflection components to professional development programs helps educators attend to the *conditions* beyond skills development and move toward educational technology adoption (Collis, 1996; Ertmer, 2003; Geyer, 1997).

This Digest briefly reviews connections among the literature on the adoption of innovations, technology integration, and reflection as a precursor to presenting an example of reflective practice during a technology integration professional development program. The reflection component is designed to help educators reflect on the possibilities and challenges of their surroundings as they construct knowledge of how best to integrate educational technologies into teaching practices.

Adoption of Innovation

From the statistics presented above it is clear that adopting technologies as a part of teaching practices does not magically happen when technology is made available. There is a complex change process that one progresses through in stages when such an innovation is introduced. Acknowledging that conditions must be right to spawn change is particularly critical in the initial stages of adoption (Ely, 1999). At this point an educator is forming an attitude toward the behavioral intent to pursue or reject the innovation (Ellsworth, 2000; Rogers, 1995). Forming an attitude toward an innovation begins when the individual learns of the innovation. Sustained adoption requires progression through stages of knowledge and practice development supplemented by careful consideration of the successes and challenges of adopting the innovation. Ongoing interaction, successful practice with an innovation, and careful reflection about new situations and outcomes provide a foundation upon which educators decide to adopt or reject educational technologies as a part of their everyday teaching practices.

The Value of Reflection

One of Dewey's (1933) basic assumptions was that learning improves to the degree that it arises out of the process of reflection. Reflection arises because the organism detects the appearance of incompatible factors within a situation then develops opposed responses in an attempt to further engage in and understand the situation, thereby constructing knowledge. Knowing therefore is not a process of registration or representation, but one of intervention. Knowledge is constructed, in part, through reflection, e.g., ongoing active, persistent, and thoughtful consideration and participation in a situation (Canning, 1991). The cycle of reflecting and constructing knowledge is thus determined by the changes one finds satisfactory about a new situation on the whole or by the discovery of new features that give the situation new meaning. Thus, reflection is important in encouraging educators (organisms) to explore the integration of new educational technologies (incompatible factors) into their current teaching practices (situation) to reduce the perception of incompatibility. Such reflections prompt educators to face personal and environmental constraints, incrementally develop new practices that led to successful implementation, and specify for themselves the relationships between theoretical benefits of an innovation and successful practice (Collis, 1996; Dias, 1999; Ertmer, 2003).

An Approach to Prompting Reflection

Structured guidance in the form of asking questions and providing reflection guidelines helps novice educators become more autonomous thinkers (Pultorak, 1996). Structured, short, open-ended questions help educators move through the stages of adoption; become more aware of their surroundings; identify successful and unsuccessful patterns of behavior and activities in their classrooms; and develop new ways for them and their students to interact in the environment (Pultorak, 1996; Putnam, 1991; Schön, 1983; 1989). Novices become better able to reflect on and respond in ways in which they feel they can succeed with new technologies. Later, as they move toward expert practice, novices begin exploring the reasoning behind their responses and reframing situations based on new knowledge of the innovation and their practice. They pay more attention to strategies of inquiring about their reasoning and develop greater abilities to enhance teaching and learning through the innovation. This indicates that they are engaging in higher levels of reflective practice and adopting the innovation.

An Example of Reflective Practice to Support Adoption of Educational Technologies

This example of a technology integration program uses reflective practice to engage educators in progressively more reflection and application activities during ongoing efforts to adopt newly acquired technologies. Through planned interactions with the new technologies and prompted reflection assessing this innovation in practice, it is expected that educators will develop strong reflective and technology integration techniques that become an everyday part of their teaching practices.

The training begins with presentations of models of best practices in integrating new technologies into teaching and learning. According to Koszalka, Grabowski, & McCarthy's (2003) guidelines for reflection, educators are then prompted to identify characteristics that reflect their beliefs of ideal teaching and to develop a list of actions they believe are important in transforming their classrooms into an ideal technology-sup-

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ported learning environment. Questions are used to prompt educators to reflect on their beliefs about ideal teaching and learning; how well the examples match their ideal, personal preferences for teaching; their personal readiness to use new technologies; and how new technologies could help them move from current to ideal. As an initial step, this is a low level of reflection, based more on perceptions than personal practices.

Next, educators are asked to reflect on their experiences with technology, teaching, students, curriculum resources, and educational standards in their classrooms. As Geyer (1997) suggested, they are prompted to *reflect* specifically on lessons, activities, and strategies that worked well previously and *think* about how to integrate new technologies to enhance them. This reflection point integrates thoughts of previous experiences into developing new practices. By using a repertoire of successful activities, educators have enough familiarity with old procedures to ensure successful instructional outcomes using new educational technologies. They then redesign these lessons to incorporate new technologies and test them in their classrooms.

A critical opportunity is to follow the classroom trial immediately with reflections on modifications that needed to be made during the lesson, how the educator and students interacted together and with these new technologies, and what worked or did not work well. The educators use these reflections to redesign the lesson and immediately test it again, reflecting on the nuances of this version and successes and challenges.

The educators share their reflections during a follow-up session with their peers and discuss implementation and modification of the trials and their beliefs about how they adapted the technology or their teaching practices during the process. The multiple practice experiences prompt deeper reflection as educators identify patterns among their experiences. Reflection deepens at this time as educators reflect on their progress toward their ideal technology-enhanced classroom.

As the process continues, educators are continually prompted to reflect on their knowledge of their own teaching, their use of new technologies, their observations of student interaction and learning, needs for support, and overall changes in their attitudes and perceptions of this innovation. During each use of the new technologies, they are prompted to adjust the lesson based on their thoughts of what was working and what was not. Such reflection often leads to identification of obstacles to integrating educational technologies, but more importantly such reflections are most helpful when focused on identifying alternatives and solutions to achieving the ideal technology-enhanced classroom. Thus, as Eib & Cox (2003), Ertmer (2003), and Lin (2001) suggested, reflection must be focused throughout the adoption processes to help educators resolve their own practice challenges in order to facilitate changes in their own beliefs about their role in technology-enhanced instruction and the benefits of using educational technologies in the classroom.

Conclusions

The most successful professional development sessions support educators in a cyclical reflective process to help them specify for themselves the relationship between the theoretical benefits of an innovation and successful practice (Collis, 1996; Dias, 1999; Ertmer, 2003; Wood & Bennett, 2000). Reflection that increasingly challenges educators to consider changes in their practices as part of adopting new innovations helps educators devised technology integration strategies that lend themselves to the to configuration of the classroom, enlist support to help develop necessary skills, and use technology-based resources that are accessible and appropriate to the classroom (Medeiros, 1999). Such reflective practice promotes understanding of underlying beliefs and their relationship to pedagogy (Canning, 1991) as well as helps educators identify and resolve issues associated with using educational technologies.

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